REMARKS

By this response, claims 1 and 5 have been amended without narrowing their scopes. Applicants submit that the claim amendments (a) do not introduce new matter; (b) do not raise a new issue that would require further search or consideration; (c) place the application in better condition for appeal; and (d) the amendments do not add any new claims. Thus, the amendments should be entered. Reconsideration and allowance of the application are respectfully requested.

Obviousness-Type Double Patenting Rejection

Claims 1-12 stand rejected under the doctrine of obviousness-type double patenting over claims 1-13 of co-pending U.S. Patent Application No. 10/726,542. Applicants will reconsider the propriety of submitting a Terminal Disclaimer with respect to the '542 application to obviate this rejection once allowable subject matter has been indicated in this application.

Rejection Under 35 U.S.C. § 103

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) over G. Antonelli, "Non-Destructive Condition Assessment of Serviced MCrAlY Coatings" ("Antonelli") or G. Antonelli et al., "Qualification of a Frequency Scanning Eddy Current Equipment for Nondestructive Characterization of new and Serviced High-Temperature Coatings" ("Antonelli et al.") in view of the "admitted prior art of the instant disclosure" ("APA") The reasons for the rejection are stated on pages 3-4 of the Office Action. The rejection is respectfully traversed.

Claim 1, as amended, recites "a method of determining the service metal temperature of a γ/γ′ MCrAlY-coated component after use of the component in a high temperature environment, where the γ/γ′-MCrAlY-coating of the component exhibits a non-equilibrium γ/γ′-microstructure at a temperature lower than the temperature during operation and the depletion of chromium from the γ/γ′-MCrAlY-coating still allows the α-Cr phase to form, the method comprising: (a) measuring qualitatively impedance curves or measuring the coating electrical conductivity and magnetic permeability of the non-equilibrium MCrAlY-coating of the component in the post-service condition at different locations of the component by means of a multi-frequency eddy current system; (b) then subjecting the coated component to a heat treatment to transform the non-equilibrium MCrAlY coating into an equilibrium microstructure of the coating; (c) then measuring qualitatively impedance curves or measuring the electrical conductivity and magnetic permeability of the equilibrium MCrAlY- coating at different locations of the component by means of a multi-frequency eddy current system; and (d) determining the exposure temperature of the different locations of the component based on the difference in the measured impedance curves or the measured conductivities and permeabilities, before and after the heat treatment according to (b)" (emphasis added).

As explained at page 3, lines 16-27 of the present specification, during an engine stop from the operating temperature down to below 600°C, a γ/γ' MCrAlY-coating exhibits a non-equilibrium γ/γ'-microstructure at room temperature due to the rapid cooling. The non-equilibrium microstructure is present because equilibrium phases that are stable at low temperatures, such as the α-chromium phase, cannot re-precipitate during such rapid cooling. The resulting non-equilibrium microstructure

of the coating results in a modified coating electrical conductivity. Consequently, a NDT coating assessment using the multi-frequency eddy current method is unreliable.

In light of this problem regarding unreliable NDT coating assessment, Applicants determined that by subjecting a component including an applied γ/γ' MCrAlY-coating to the heat treatment recited at (b) in claim 1 (to produce an equilibrium microstructure of the coating) **after** using the component in a high temperature environment, i.e., a post-service condition of the coating, **and after** performing step (a) of "measuring qualitatively impedance curves or measuring the coating electrical conductivity and magnetic permeability of the non-equilibrium MCrAlY-coating of the component in the post-service condition at different locations of the component by means of a multi-frequency eddy current system," a non-destructive testing method can be used to determine Al and/or Cr depletion within the γ/γ' MCrAlY-coating. The heat treatment is not performed before step (a) because this would change the component's microstructure and falsify the results attained by the method.

The applied art fails to suggest the method recited in claim 1, which determines the depletion of Al and Cr of a **γ/γ'** MCrAlY-coating. In contrast, Antonelli and Antonelli et al. both disclose measuring the electrical conductivity and magnetic permeability of a **γ/β** MCrAlY coating using a multi-frequency eddy current system.

The method disclosed in Antonelli and Antonelli et al. is only applicable to measuring **γ/β** MCrAlY coatings due to the structural characteristics of such coatings. Such γ/β MCrAlY coatings do not present the same measurement difficulties as γ/γ' coatings. The applicability of NDT eddy current methods for

estimating the expended life of service-exposed γ/β MCrAlY coatings is straightforward as compared to using such techniques for γ/γ' coatings. A MCrAlY alloy with a γ/β structure is stable on a wide temperature range. In contrast, the microstructure of a non-depleted SV20 coating is strongly dependent on the temperature the component is subjected to during operation.

The Office Action acknowledges that Antonelli and Antonelli et al. both fail to suggest the features of "subjecting the coated component to a heat treatment to transform the MCrAlY coating into an equilibrium microstructure of the coating," as recited in claim 1. However, the Office Action contends that the APA cures the deficiencies of Antonelli and Antonelli et al. Applicants respectfully disagree.

The "standard heat treatment" described at page 5, line 19, of the present specification is a diffusion heat treatment applied to a new part during the manufacturing process, i.e., before the part is used in service. As such, the diffusion heat treatment is different from the heat treatment recited in claim 1, which is performed **after** the component has been used in a high temperature environment **and after** performing step (a). The claimed heat treatment transforms the non-equilibrium microstructure of the coating into the equilibrium microstructure. Accordingly, APA does not provide the required motivation to modify Antonelli or Antonelli et al. to achieve the method recited in claim 1. Thus, the applied art does not support the asserted *prima facie* obviousness. Therefore, claim 1 is patentable.

Claims 2-12, which depend from claim 1, are also patentable over the applied references for at least the same reasons as those for which claim 1 is patentable. Therefore, withdrawal of the rejection is respectfully requested.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. Should there be any questions concerning this response, or the application in general, Applicants' undersigned representative can be reached at the telephone number given below.

Respectfully submitted,

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